

Created by Jennifer Sage, ICA Master Instructor
 Training Type: Threshold development (LT, FTP)
 Working HR Zones: Zone 4–5a
 Total Class Length: 60 minutes

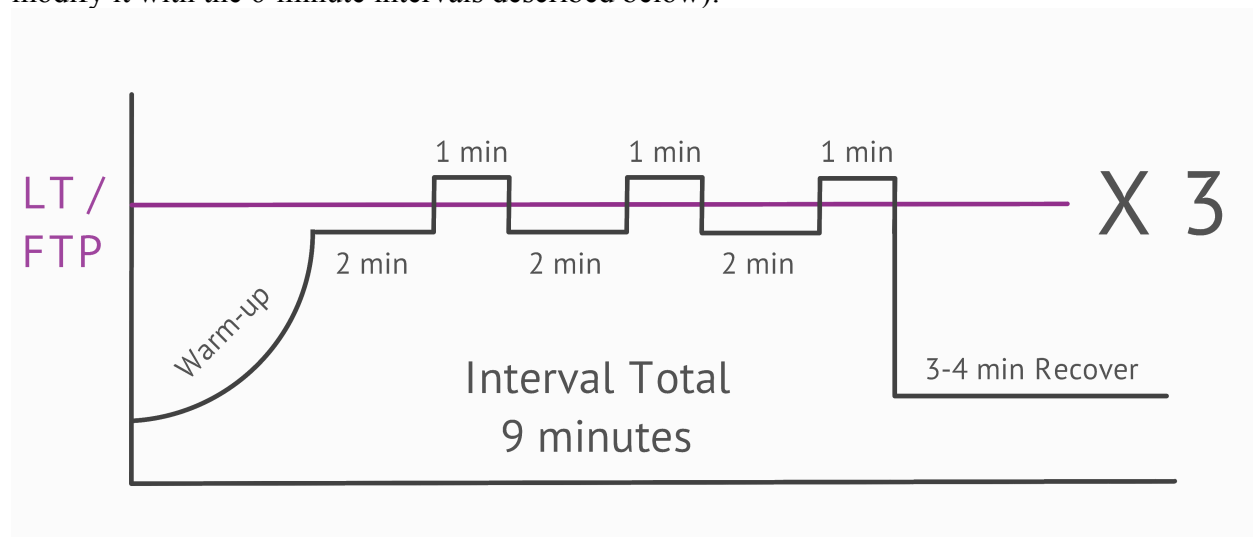
Profile Objective and Intensity:

This very effective training session consists of three sets of 9-minute efforts, alternating between 2 minutes below LT and 1 minute above, three times. Each set will be followed by a 4-minute recovery in Zone 1–2. Each of the three sets will have a different cadence—two on climbs, one as a fast flat.

The objective of this profile is to work at lactate threshold intensity, or Functional Threshold Power (FTP) intensity, for an extended period with the goal of increasing maximum sustainable power. You are forcing your body to deal with a lot of lactate for a relatively long period of time. Still, most of the effort is below lactate threshold. When you do exceed your threshold (the “Overs”), you generate more lactate and H+ and force the body to process it, even while “recovering” at a relatively high intensity (the “Unders”). You also develop the ability to handle changes in pace during hard sustained efforts.

Training a few beats below and a few beats above lactate threshold or FTP is a powerfully effective intensity for improving threshold and endurance.

If you have a dry erase board to write your profiles, draw this diagram up on the board (or modify it with the 6-minute intervals described below):



HR, Power, or RPE?

If you have power meters and have done an FTP test, then use your FTP power levels and observe the HR. The Unders should be about 95%–97% of FTP, and the Overs 2%–5% over.

If you only have HR, then use your field-tested threshold. The Unders will be 2–4 beats below LT, and the Overs will be just a few beats above it. Using RPE in conjunction with HR and/or FTP is the best option because it teaches your students the most about their abilities and their body's response. You certainly can use RPE on its own if you have students who do not have HRMs or have not done a field test, but it is not quite as effective because they may actually be at a lower HR or FTP than you are targeting, but won't know it without the metrics. For these students, coach them to tune in to the feeling in their legs and chest, and to the depth of their breathing. They should be *comfortably uncomfortable* for the Unders, and slightly *uncomfortable* for the Overs.

Modifications

This is a fairly advanced profile, but modifications can be given to less fit students to encourage them to work at a lower intensity (5–15 beats below threshold). They may not receive the specific LT adaptations, but they will still benefit in other ways from the workout, working within their own limitations and improving their aerobic endurance.

Another way to modify this profile is instead of 3 X 9 minutes, just do 3 X 6 minutes with only two Over/Unders instead of three (2 minutes Under, 1 minute Over X 2). After a few weeks of threshold training, you can add another set of 6-minute intervals, giving you 4 X 6 minutes. However, don't lose sight of the specific objective of this particular workout—to increase the amount of time your riders can sustain *right around* their threshold. Hence, use the 9-minute efforts when your students are physically and mentally ready for them.

With any of these profile options, you can play with the terrain to create a different class every time you do this workout. One time you might all use the same cadence (or a narrow range), such as all at 70 rpm, or all high-cadence climbs of 76–84 rpm. Another profile might all be fast flat cadences of 85–95 rpm. Another might start with the faster cadence and finish with two hill climbs, opposite of the way it is presented in this profile. Have fun with it! My only suggestion is to limit the time spent at lower cadence climbs (about 67 rpm and below) since it is harder on the knees for these longer durations. More importantly, low cadences have less of an impact on the heart and a higher stress on the leg muscles, and our goal with this training session is to target the cardiovascular aspect of this training.

Music

I love long songs for this profile—it makes it much easier to coach and keep riders engaged when the song doesn't change in the middle. But I'll be honest, finding 9-minute (or longer) songs can be challenging. It's even more challenging, perhaps even near impossible, to find songs this long for an audience that only likes mainstream music, as those songs tend to be much shorter in duration unless you can find a dance remix.

To make matters even more challenging, finding long songs good for faster cadences is really tough. The bpm often slows down for the faster cadence; for example you will need a 90 bpm

song for 90 rpm cadence versus a 140 bpm song for a 70 rpm cadence. This sometimes leads to a lower energy than the climbing songs. Also check the beginning of songs; some of the ones I've suggested take a minute or two before the energy and beat pick up; in that case the song needs to be longer than 9 minutes. You can always use any excess time in the song for your recoveries.

I've provided additional suggestions for electronic/world songs. For Over/Under Intervals, I prefer climbing cadences 70 rpm or higher. Higher-cadence efforts are excellent but they can prove to be very difficult for less skilled students. Usually, for higher cadences the heart rate response can be higher than for slower cadence, simply because there is greater stress on the cardiovascular system. It also has to do with efficiency. Many of our riders are not as efficient at cadences higher than 90 rpm, and therefore their heart rate and RPE will be higher, even for the exact same power output as the lower cadence efforts.

If you or your students just cannot do electronic music, that's OK! But, you may have to become skilled at using MixMeister to create seamless blends of your favorite pop or rock songs to give you a 9-minute interval. In MixMeister, you can also add loops to your favorite songs, essentially extending them, and you can alter the bpm if you find the song is a little too slow or fast.

If you must combine songs for one interval, then make sure to keep the bpm the same and use song lengths that fit nicely with the intensity changes. For example, choose one song that is 5 minutes (Under/Over/Under) and one that is 4 minutes (Over/Under/Over). That way you avoid having the change come while you are in the middle of your Under or your Over.

Also remember, you can keep your picky students happy by making sure your warm-up, recovery, and cool-down songs are pop or rock.

Over-Under Intervals Coaching

The Warm-up

In A State, U.N.K.L.E., 133 bpm, 6:59

Reason is Treason, Kasabian, 140 bpm, 4:35

Write your profile up on your dry erase board (based on the graphic provided), then describe the objectives of the workout:

I hope you're ready for an exciting and challenging training session today. As always, if you're fatigued today or just not that into high intensity, it's OK to go easier! But if you're prepared to work hard and want the exceptional benefits that this type of training has to offer, then let me take you there! I'll motivate you to give it your all.

This very targeted workout requires a specific intensity that is pretty high, but also not so high that you can't continue very long. It won't do you any good to try to push yourself higher than required, because you will no longer be getting the desired adaptations for this specific workout. I'll give you a lot of intensity cues so you'll know exactly where you need to be and what it should feel like.

(If you have some students who tend to push too hard all the time—you know, the kind who hate recoveries—then look at them and give them a wink when you say this!)

We're going to need a good warm-up, so over the next few minutes, gradually dial in a resistance so that you feel the road underneath your feet. Over the next 5 minutes, I'd like you to gradually raise your heart rate to low to mid-Zone 2, an easy to moderate pace.

After that, we're going to do some surges to get ourselves ready for the harder work that lies ahead. I don't want you to start your first interval without first "tasting" it in the warm-up!

Take them through the warm-up, occasionally suggesting they add a few heartbeats every minute or so. The total warm-up should be at least 10–12 minutes, including the shorter, higher-intensity pushes.

Here is how you do that: After 5–6 minutes of gradual warm-up, do three sets of 30- to 40-second surges, or what are commonly known as “leg openers.” You can choose to keep the same cadence and raise the resistance so that they have to push harder, or keep the same resistance and raise the cadence to close to 100 rpm. You can also alternate the two. The purpose is to spike the HR briefly, prime the body's energy systems, and prepare the legs for the hard work that lies ahead. Recover the same amount of time in between these test intervals. After these “leg openers,” spend about 2 minutes riding easy, prior to the first Over/Under.

During your warm-up, explain what is expected in the training session. The following is a lot of instruction; you may not need to say this much—it depends on your students:

A threshold heart rate is challenging, but not enough to make you want to slow down or stop in the next 5–10 minutes. In fact, you should be able to maintain a threshold intensity for at least 15–20 minutes, or longer if you're really fit, although you will have to talk yourself into it. Once we start the interval, you will ride for 2 minutes a few beats below LT, then raise the HR by 4–5 beats, so we're just above it; you'll hold that for 1 minute. Then we'll repeat that three times in one set, for a total of 9 minutes. We are going to do three of these sets, for a total of 27 minutes right around your threshold! That's a lot!

As far as your intensity and what it should feel like, let me use myself as an example: My LT is 160. I'll do the "Unders" at 157–158 and the "Overs" at 161–162. (Instructors: Obviously, change the numbers to reflect your threshold.) It should feel "comfortably uncomfortable" when you're just below, with no burning sensation in the legs but a challenge as you pedal. On the other hand, it should start to feel a little uncomfortable when you're above, with a little burning in the legs, though certainly not like a sprint or attack.

Then, when you drop from the "Over" to the "Under," it's a subtle change, but you'll feel a mild sense of relief. Nevertheless, it won't be a complete recovery—you'll still be working hard!

There are lots of great adaptations taking place here! When you're just below LT, you're body is not generating enough hydrogen ions to slow you down (those little bad boys that cause the burning in the muscles), but you're improving your ability to use the oxygen being delivered to your muscles and getting great aerobic benefits. Just above LT, you're generating more lactate and ions than your body can flush out, but it's only a minute, so what you are doing is teaching the body to handle it better. Coaches call that improved lactate clearance...I just call it getting more fit!

But this is important...that's why you don't want to go too high above LT—you'll generate far too much lactate and become too acidic, and you don't want that. Are you with me? That means, don't try to make this even harder than it is...you will not get the benefits we are seeking. This is a great training session, one used by the pros, so you can feel proud that you are training like they do!

If you do not have a HRM today, that's OK too. I'll guide you to the muscular and breathing sensations you should be feeling at each intensity. You should know that you would reap far more benefits if you did have a HRM, though (hint, hint)!

We will do these intervals at three different cadences. The first is 68 rpm, the second is 71 rpm, and the third is 94 rpm, a fast flat road. That last one is going to be pretty challenging.

At the very beginning of each one, you'll stand up for 30–40 seconds to raise the intensity. Use the first one as kind of a test to determine what resistance you need to dial in. Then for each of the "Overs" you have a choice. My recommendation is to stand for only 5–15 seconds, then sit the rest of it. You can even stay seated as you raise the intensity if you want. Do that especially if standing tends to spike your HR. Or, for the first climbing interval, at the slower cadence, if you feel like you can do a standing climb for a minute and keep your

HR steady at that few beats above LT, then go ahead and stand. But you have to be careful. For the last interval on the flat road at 94 rpm, standing will be limited. We'll talk more about that later...

Just so you know, you MAY or MAY NOT actually reach your target HR on the first few reps of the first set, even though your RPE tells you you're there. That's OK. The first set is a test, and your body may need the extra time to warm up.

Are you ready to start the first one? Great, let's go!

Interval #1: Curved Air (Filur Remix), Reefer Decree, 137 bpm, 9:10

Here we go—stand up and bring your intensity up. Don't go breathless! Stay in control.

(After 30 seconds, have them sit down) Now fine-tune your resistance and dial in that sensation to just below threshold. Like I said, your HR, may take half this interval before it stabilizes.

Instructor: Your goal for the next 9 minutes is to guide them to stay on target. If this is the first time you are doing Over/Under Intervals, they'll need more coaching. As you make this a part of your regular repertoire, they'll know what to expect.

After the 2 minutes of the “Under”, say:

OK, add some resistance and let's stand up. Drive the legs, but be very subtle—don't overshoot it. Stand up for 5–10 seconds, then sit, or stay standing if you want, but only if you can stay in control of your intensity. This is NOT a sprint, NOT an attack! You should feel a slight burning in the legs, your legs are talking to you, letting you know they are working. Your breathing is faster, but not out of control. Mentally, you have to commit to this effort.

Hold 1 minute. When it's time to drop to the “Under” say:

OK, this is where it takes a little control—be subtle. Ease up on the resistance ever so slightly. You'll feel a slight sensation of relief, the burning will subside, but you know for certain that you are still working. Hold this for 2 minutes.

Repeat three times. You can let them know the next change (either up or down) is coming with a 5-second countdown. Repeat your RPE descriptions when needed, but leave them be as much as possible. You don't need to talk the entire time.

Recover: Everybody Got That Something, Nikka Costa, 104 bpm, 4:22

(Note: It is not necessary to hold this bpm/rpm during the recoveries.)

After the third “Over,” say:

Whew! Back off the effort, back off the gear. Use your breathing to help lower your HR.

One down, two more to go. Enjoy this recovery—you are going to need it.

Reflect on what you just did. Did you have a hard time reaching your target? What can you do to be better next time?

I bet the second one will be much better, because now you are more warmed up and you know what to expect. Did you find that you overshot your HR, both on the way up and the way down? Use this next interval to dial in your control of your intensity and be even more subtle. You are in control...stay that way!

Interval #2: Palladio (Symphony Mix), Silent Nick, 142 bpm, 9:44

For the next 9 minutes, guide them through the Overs/Unders much like the previous set. The rpm is just a little bit faster. If you need additional coaching cues, use a few of the following:

You guys are looking awesome. I love your commitment.

Stay on target! You are doing great.

(For the Under) Imagine that you could hold this pace for 20 minutes if you really needed to. It's a good working pace.

(For the Over) As you stand for the Over, imagine the hill just got slightly steeper—add some resistance accordingly, but be careful; keep it subtle as you raise your intensity 4–5 heartbeats. Feel the legs respond to the hill; they're talking to you! Not screaming at you, but definitely letting you know they're paying attention.

(From Over to Under) 3-2-1, now drop your heart rate 4–5 beats. Picture the road subside just a little; a small sigh of relief felt by the legs.

(From Under to Over) In 10 seconds you're going to take it back up—you should know what this feels like by now—try to be right on target this time. Ready...and UP!

(For the final Over) Only 1 final minute, hold on to your commitment!

Recover: Good Morning, Rogue Wave, 138 bpm, 4:08

When you recover, after a couple of minutes have passed and the HR has dropped, you can allow them to stand and jog easily if they aren't used to sitting so long in the saddle (but don't let it interfere with their recovery).

Prepare them for the final interval:

This next one may be the most challenging—that's why I saved it for the end. Our cadence will be 94 rpm. You'll stand for the first 30 seconds, but don't worry so much about cadence at that point—just bring the intensity up. Then sit down, grab the beat, and guide your intensity to your "Under" target HR. For the "Over" you may or may not want to stand—the cadence is too high for many people to stand with good form. It's your choice, but remember, we want form first. If you do stand, keep it short. You'll need a little more resistance when standing. When it's time to drop it back down to the Under,

ease up the gear slightly. It may take a while for the HR to back off, since HR is more affected by faster cadence.

Interval #3: Arab Star, Warp Technique, 94 bpm, 10:42

This is a fabulous, long song with a great rhythm for higher-cadence work. But it has a long build up and the beat doesn't get going until 2:25, so you will ride easy during the first part of the song. Begin at 1:45 into the song by standing at that point (even though the beat hasn't kicked in) so you'll have a full 9 minutes. For this part, cadence can be whatever feels good to them; you'll be standing for about 30 seconds. Then once the beat takes off at 2:25, have them sit down and pedal on the beat of 94 bpm. At 5 minutes, the song takes an energy break for 75 seconds. During this time, have them focus inward during their second "Under." I usually say, "The song takes a break here...but you don't! Keep your focus."

Guide them through the next 9 minutes. Use occasional RPE cues, but talk sparingly. They know what to do now, let them accomplish it. If you need more coaching cues, use some of the following:

I bet this higher cadence gets your heart rate up more quickly—it will feel different than those two climbing intervals. Notice that difference; appreciate the difference!

Depending on your training, you might prefer the slower cadence over the faster, or vice versa. But we all need to get better at a wider range of cadences; we all need to think outside of our box. So if this is the cadence you do not prefer, then this is your biggest lesson of the day. Accept the challenge!

If you absolutely must take a saddle break, do it at the beginning of the OVER to help raise the HR, but then try to sit back down. It's OK to drop your cadence when you stand.

(If they start looking like they need focus) Think of all the great stuff going on in your body right now, think of all that O2 you're delivering and using! When you're below threshold, you're still burning fat—imagine it being gobbled up!

(As you approach the end) We're all in this together. Don't ease up on me, not quite yet. Only one more Over and we get to recover!

Cool-down: Enchantment, Chris Spheeris, 4:31

Nature, Ruben & Rose, 4:58

Cool down at least 5–8 minutes, dropping effort to Zone 1.

Congratulate them as they recover. Remind them the great physiological benefits they just received. Remind them how their legs grow stronger when working at a consistent pace for longer periods, and how their cardiovascular system grows stronger and gains endurance when they work right around their threshold level. You might even tempt them with another similar profile in three weeks, perhaps with slightly different focus (terrain/cadence). Tell them it's a chance to get even better at this intensity.

Finish with a stretch.

Over-Under Interval Quick Profile

Length	Description
6:59	Warm-up and Introduction In a State, U.N.K.L.E Gradually bring HR to Zone 2
4:35	Warm-up Surges Reason is Treason, Kasabian Do 3 sets of 30- to 40-sec surges with 30–40 sec recovery to prepare the body for the work ahead. Increase intensity with resistance or cadence, or alternate them. Then ride easy.
9:10	First 9-min Interval: Curved Air (Filur Remix), Reefer Decree 2 minutes Under/1 minute Over X3, 68 rpm
4:22	Recover: Everybody Got That Something, Nikka Costa
9:44	Second 9-min Interval: Palladio (Symphony Mix), Silent Nick 2 minutes Under/1 minute Over X3, 71 rpm
4:08	Recover Good Morning, Rogue Wave
10:42	Third 9-min Interval: Arab Star, Warp Technique, 94 rpm (start interval 1:45 into the song) 2 minutes Under/1 minute Over X3, 94 rpm
4:31	Recover: Enchantment, Chris Spheeris Bring HR down
4:58	Cool-down, stretch: Nominus Musica (Da Beat Mix), Hypnotic



Master Class
Over-Under Intervals
A threshold workout

Over-Under Intervals
Music Playlist and Resources

Song title, Artist, Album, length, bpm

In a State, U.N.K.L.E, Never Never Land, 6:59, 133 bpm
Amazon

Reason is Treason, Kasabian, Kasabian, 4:35, 140 bpm
eMusic, Amazon

Curved Air (Filur Remix), Reefer Decree, First Link, 9:10, 137 bpm
This version is hard to find. There are many shorter versions that won't work for this profile (but are still great for others). Google it; you may find it as an import CD, or use one of the alternate suggestions.

Everybody Got That Something, Nikka Costa, 4:22, 142 bpm
Amazon

Palladio (Symphony Mix), Silent Nick, Palladio, 9:42, 142 bpm
iTunes

Good Morning, Rogue Wave, Permalight, 4:08, 138 bpm
eMusic

Arab Star, Warp Technique, Mahamaya 5 Years Compilation (or on the album Make Animals Happy), 10:42, 94 bpm (start interval 1:45 into the song)
Amazon

Enchantment, Chris Spheeris, Best of Chris Spheeris, 4:31
eMusic

Nominus Musica (Da Beat Mix), Hypnotic, The Mystic Art of Chill Vol. 2, 4:30
Amazon

**Alternate Electronic/World Long Song Suggestions, 9–11 minutes
 (Song title, Artist, Album, bpm, Length)**

Climbs 130–160 bpm (65–80 rpm) (Note: I prefer 140 bpm/70 rpm and higher for the climbing threshold intervals, but there are some great songs that are a little bit slower)

A Night in Cairo, Tegma, Around the World in 80 Minutes, 132 bpm, 9:38
 Chutney Punch, Frogacult, Something for Sundays, 132 bpm, 9:29
 Give Me Luv (That Kid Chris Tribute Mix), Alcatraz, 132 bpm, 10:28
 New Year's Day [Ferry Corsten Extended Vocal Mix], U2, War [Deluxe Edition] Disc 2, 134 bpm, 9:42
 Just Be (Feat. Kirsty Hawkshaw) [Antillas Club Mix], Tiesto, Just Be: Remixed. 134 bpm, 9:53
 Qula, Etnoscope, Drums From The Dawn Of Time, 140 bpm, 10:11
 Extremely Well, Klangstrahler Projekt, Sinnestauschung, 140 bpm, 10:47
 Mahadeva (John 00' Fleming Remix), Astral Projection, 140 bpm, 9:32
 Xibalba, Antares, Dimensional Gateway, 144 bpm, 9:58
 Black Hole (Extended Trip), Arronax & Somnesia, Dimensional Gateway, 144 bpm, 10:34
 Sunshine (Middle East Remix), Tikal, Cosmic Dragon, 145 bpm, 10:05
 2046, Saafi Brothers, Mystic Cigarettes, 154 bpm, 14:26 (fast climb; use part of the song as recovery)

Faster cadence 160–190 bpm/80–95 rpm

Treibstoffmasse, Sternenspringer, Kosmoraum VA, 160 bpm, 10:44 (a bit lower energy)
 The Dunes, AmBeam, Land Of Memories, 85 bpm, 11:25
 Things Can Change, Klangstrahler Projekt, Sinnestauschung, 86 bpm, 10:06
 Hemisphere, Synaesthesia, Embody, 88 bpm, 10:14
 Stonehenge, Chronos, Steps To The Great Knowledge, 90 bpm, 10:43
 Purple Juice, Seamoons, A Twisted Downbeat Adventure, 91 bpm, 9:14
 Supervision, Saafi Brothers, Mystic Cigarettes, 91 bpm, 10:39
 Consciousness, Damian L, My World, 95 bpm, 9:44
 Triangle, Sounds From The Ground, Kin, 96 bpm, 10:13
 Heartland, AmBeam, Unlimited Mind, 97 bpm, 9:34
 Long Ride To Fargo, The Push, Waveform Transmissions Vol. 3, 99 bpm, 10:01 (great song; a little fast)